Stauffer CHEMICALS

PRODUCT DATA SHEET

...LIEVE ALL INFORMATION GIVEN IS ACCURATE. IT IS OFFERED IN GOOD FAITH, BUT WITHOUT GUARANTEE. SINCE CONDITIONS OF USE ARE BEYOND OUR CONTROL, ALL RISKS OF USE ARE A...UMED BY THE USER. NOTHING HEREIN SHALL BE CONSTRUED AS A RECOMMENDATION FOR USES WHICH INFRINGE VALID PATENTS OR AS EXTENDING A LICENSE UNDER VALID PATENTS.

SPECIALTY CHEMICAL DIVISION

VICTAWET 12

DESCRIPTION: A low foaming nonionic complex phosphate ester surfactant, available as 100% active liquid.

FORMULA: (empirical)
$R'\ O\ P(O)\ (OR)_2$
R = water solubilizing group
R'= medium chain alkyl group

COLOR APHA: 500 max.

APPEARANCE: No more than slight haze.

pH (0.5% soln.) 7.0 - 7.4

SPECIFIC GRAVITY: 1.110 - 1.123 @ 25/25°C

ACID NUMBER: 0.1 max mgkOH/gm

SURFACE TENSION: 29.4 dynes per $cm.^2$ (0.2% conc.)

SOLUBILITY: Dispersable in water (forms milky solution) soluble in alcohol, acetone, toluene insoluble in naphtha.

DRAVES TEST: 20 sec. @ 0.2% solution

P_2O_5 Content wt% 16 min.

STABILITY: Victawet 12 is effective in both acid and alkaline solutions. It is dispersable in 5% sulfuric and sodium hydroxide.

FLASH POINT, of: 125 min.

FOAMING: As determined by the Ross Miles foam test, Victawet 12 gives very little foam. At 0.2% concentration @ 110°F the height of foam was:

Distilled water	Initial	12 mm.
	5 min.	6
3% H_2SO_4	Initial	0
	5 min.	0
3% NaOH	Initial	2
	5 min.	0
3% STP (Sodium Tripolyphosphate)	Initial	5
	5 min.	4

SUGGESTED AREAS OF APPLICATION:

1. Emulsion Polymerization:
   emulsifier for polymerizations,
   emulsion stabilizers.

2. Vinyl Plastisol and Organisol Stabilization:
   provides color stability, excellent
   pigment dispersion and viscosity control.

3. Emulsion and Latex Paints:
   Emulsifier and pigment dispersant.

4. Dispersions:
   Dispersant for various powders and
   pigments.

5. Metal Processing:
   Detergents for alkaline soaks,
   acid cleaning and emulsion degreasing;
   pickling aids.

6. Investment Casting:
   Wetting agent for investment casting
   slurries.

7. Textile Processing:
   Kier boiling agent, dye leveling agent,
   antistatic agent and lubricant for
   synthetic fibers.

8. Papermaking:
   Pulp cooking aid and felt cleaning
   detergent.

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212-421-5000

CALIFORNIA 90005
500 So. Virgil Ave., Los Angeles
213-385-5341

DELAWARE 19803
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Independence Mall, Wilmington
302-OL 8-6588

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OHIO 44303
32 Edgerton Road, Akron
216-762-9381

TEXAS 77025
Suite 300A
6910 Fannin Street, Houston
713-748-0743

VICTAWET

Price List
Effective Date: July 1, 1970

	Price Per Pound			Net Weight Pounds	
	T/L	LTL	5 Gal.	Drums	5 Gal.
Victawet 12	$0.50	$0.55	$0.75	500	45
Victawet 35B	0.395	0.415	0.60	140	35
Victawet 58B	0.50	0.515	0.70	135	35

F. O. B. Gallipolis Ferry, West Virginia

T/L Minimum 20,000 Pounds

Terms: Net 30 Days

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SPECIALTY CHEMICAL DIV. COMMERCIAL DEVELOPMENT DEPT.

VICTAWETS 12 - 35B - 58B - 85X FOR VINYL FORMULATIONS

Victawets are organic phosphate derivitives which provide excellent light stabilizing effects in vinyl formulations. They are effective with both vinyl chloride and vinyl copolymer resins, and are compatible with plasticizers, working particularly well with dioctyl phthalate. Fade-Ometer tests running up to 1,000 hours without breakdown have been reported.

Victawet	12	35B	58B	85X
PHYSICAL STATE:	Liquid	Paste	Paste	Powder
SPECIFIC GRAVITY:	1.12	1.17	1.19	0.92
pH:	7.0	7.0-7.4	7.0-7.4	8.0
TYPES OF FORMULATIONS:	Plastisol Organosol Solvent	Organosol Latex	Organosol Latex	Plastisol Organosol

COMPOSITION: All are free from lead and other heavy metals.

APPLICATIONS: In addition to light stabilization, these products assist in securing better dispersion of pigment and attractive, smooth film surfaces. In some cases, color stabilization with certain classes of pigments also has been reported. They also contribute some heat stability, with extra heat resistance obtainable by using them with about equal parts of the metal salts commonly employed as heat stabilizers. Formulations prepared in this manner have given excellent results under severe exposures to both heat and light.

APPLICATIONS (cont.)

These products range from water-white to light tan in color, but neither color nor odor of the finished film is affected. Used at only 1% to 5% of the weight of the resin in the formula, they are decidedly economical.

These products blend readily into formulations during usual milling or mixing operations. Ordinarily, the use of 2-4% by weight of the resin in the formulations provide excellent light stability. Up to 5% is sometimes used for better pigment dispersion and more heat stability.

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APPLICATION DATA

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VICTAWET 12®

IN

EMULSION POLYMERIZATION

STAUFFER CHEMICAL COMPANY
SPECIALTY CHEMICAL DIVISION
299 PARK AVENUE, NEW YORK, N. Y. 10017
TEL. (212) 421-5000

VICTAWET 12 IN EMULSION POLYMERIZATION

Introduction

VICTAWET 12 has a unique structure among phosphate esters, offering properties not available in any other surfactant. In addition, being highly hydrophobic, it can be used with conventional protective colloids or combined with inexpensive non-ionics to make emulsions with excellent properties.

A standard laboratory recipe for a PVAc emulsion and the properties obtained are shown to demonstrate the effectiveness of VICTAWET 12. The recipe is a suggested starting point for further formulation of PVAc and experimentation with PVAc copolymer emulsion systems.

Properties

Type	non-ionic, complex alkoxy phosphate ester.
Formula	$RO\ P(O)\ (OR')_2$ R = alkyl group R' = water solubilizing group
Activity	100%
Av. mol. wt.	474
Color	pale amber to while liquid
Critical Miscelle Conc. (CMC)	.001% by weight
Surface Tension	at CMC was 32.8 dynes/cm^2 at 25°C

Advantages in emulsion polymerization

1. Unusually low foam, less than any other emulsifier tested.
   a) Permits increased batch size.
   b) Eliminates need for defoaming agents.
   c) Prevents foam in cast film.

2. Low viscosity
   a) Permits higher solids content.
   b) Advantageous for many end-use applications.
   c) Permits better control during polymerization.

3. High conversion levels
   a) Greater yields
   b) Less residual monomer
   c) Reduced odor

4. Low use level
   a) Economical
   b) Less surfactant in ultimate applications

5. Flexibility of formulation
   a) Can be formulated with standard protective colloids.
   b) Can be used with less expensive non-ionic surfactants.

6. Excellent stability
   a) Very good mechanical and storage stability.

7. Minimum yellowing of film
   a) no yellowing after one month exposure to UV light.

Typical Recipe (Grams)

Vinyl Acetate	549
Water	432
Hydroxyethyl cellulose	12.5
Victawet 12	4
Potassium persulfate	1.1
Sodium bicarbonate	0.6
TOTAL	999.2
% Theoretical solids	56.8

Properties of Latex

Solids, %	55
Particle size, microns	1
Particle size distribution	uniform
Viscosity (Brookfield, spindle #4 60 rpm 25°C), cps	550
Intrinsic viscosity	0.84
pH	4.0
Residual monomer, %	0.4
Acetone insolubles, %	0
Foam height, (after polymerization), ml	1
Foam height (after 1 min. shaking of diluted latex) ml	33
Mechanical stability, min	>15
Settling after one month accelerated storage stability (10% solids)	none
UV stability of film, days	>25

General

VICTAWET 12 is a mature commercial product that has been used effectively as an emulsifier, stabilizer, and dispersant for over ten years.

VICTAWET 12 is presently being used to manufacture commercial emulsion polymers. It is available promptly in truckload quantities.

Test Procedures

1. Solids content - The non-volatile content of the latex was determined by drying a 2 g. sample in an oven @ 105°C to constant weight.

2. Foam test - The emulsions were diluted 1 to 1 with water (approximately 28% solids). A 50 g. sample of the diluted latex was then placed in a 100 ml graduate and the height of the liquid recorded. The latex was then shaken for one minute and the height measured in ml.

3. Mechanical stability - The latex was agitated violently with a high speed Waring blender, and after 15 minutes examined for presence of coagulant.

4. Residual monomer - The residual vinyl acetate monomer was determined by titration of approximately 5 g. of latex sample with 0.1N bromine solution using a potassium starch indicator.

5. Acetone insolubles - Films of the emulsions were drawn, dried, and weighed, then extracted with acetone for 24 hours with mixing. The solids content of the acetone solution was then determined, and the insoluble matter calculated.

6. Intrinsic viscosity - The intrinsic viscosity was determined in dilute acetone solution by use of an Ostwald viscometer at 30°C.

7. Emulsion viscosity - Brookfield viscosity was measured at room temperature, using spindle #4 and 60 rpm. The viscosity was tested at intervals over one month.

8. Particle size - Particle size was determined by evaluation using microscope with calculated eye piece.

9. Accelerated storage stability (settling) - The samples of latex were diluted to 10% solids by the addition of distilled water. Approximately 50 ml of diluted latex was placed in 100 ml graduated cylinder. The amount of separation of supernatent water was recorded at intervals.

Polymerization Procedure

The apparatus consisted of a three-neck 2000 ml flask equipped with a reflux condenser, laboratory stirrer, dropping funnel and thermometer. Heating was by means of a water bath.

Ten percent of the total amount of vinyl acetate monomer and all of the remaining ingredients were placed in the flask and stirred to dissolve and emulsify. The flask was then heated to reflux while mixing at approximately 500 rpm. After approximately 15 minutes, the polymerization began, as evidenced by the mixture whitening and the development of a milky appearance. The residual 90% of the monomer was then added at a constant rate over a 2 hour period. The temperature in the flask was maintained at 80°C during the addition. When the addition was completed, the temperature was raised to 90°C and held at this level for approximately one-half hour. The emulsion was then cooled and removed.

Raw Material Employed

Vinyl Acetate Monomer	Niacet HQ, product of Union Carbide.
Victawet 12	Product of Stauffer Chemical Company.
Potassium Persulfate	Product of FMC Corporation.
Cellosize Hydroxyethyl Cellulose WP09	Product of Union Carbide.
Sodium Bicarbonate	USP

NOTE:

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